FOREST REQUIREMENTS FROM THE VIEWPOINT OF RESEARCH

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A major objective of the research forester in the field of forest production is improvement in the quantity and quality of forest crops produced by a given quantity of forest land. More simply, this means he must aim to produce a better product more rapidly and to do that with increased efficiency. This involves many things, one of which is an improvement in the basic material with which he must work, namely, trees. And in recent years this pursuit has led him more and more to the possibilities for improvement inherent in tree species and to variations within these species which may be brought out through racial selection, tree breeding, and related activities.

More specifically along these lines of thought, it is generally agreed among research foresters that we need to pay particular attention to improvement of the quality of our present forest stands as a first step in forest management of any property dedicated to production of forest crops. This concept, in fact, dominates most management plans, along with building the volume of growing stock. While it must be granted that a great deal of the needed improvement can be done mechanically in our present stands, that is, through removal of poorly-formed, decadent trees in harvest cuttings, various silvicultural intermediate cuttings, and by pruning, there is a great deal that can be done through attention to genetic variations once they have been studied and their importance understood. In other words, a better understanding must be gained of the possibilities of variation within species and this knowledge applied in forest management.

Here, it should be emphasized that forestry research in tree improvement must be kept far ahead of current needs in practical management. Granted, we already know far more about forest improvement than is now actually being put into practice in most quarters, this is as it should be When answers to practical forestry questions are needed, we rarely can produce them quickly, we must have a reserve to draw upon. Tree improvement research in many phases fits in this category,that is, research in this field must anticipate demand.

The foregoing must not be taken to indicate that all tree improvement needs lie in the future. We badly need certain knowledge now, particularly in connection with research in silviculture. For example, a great deal of our stand regeneration as well as regeneration of land areas now bare of trees will be done by planting seeds or seedlings, More and more we are becoming aware that natural reproduction must be supplemented by planting of selected races of desirable species. In our oak forests, we often fail to obtain reproduction of desired hardwood species after cutting, or get reproduction from inferior parents left in the stand. Planting improved stocks of conifers and hardwoods will be one solution of this problem.

As research foresters, we would like a tree that grows rapidly, has good form of bole and crown, and is resistant to destructive insects and disease. There is no such species. However, we should develop from our best timber species, races of maximum growth rate and best form. Those races should also be resistant to their particular major insect pests or diseases. Using white pine as an example, we should develop a race that is resistant to the weevil damage which is holding back its growth and threatens to make it crooked and worthless in many stands.

The obvious need for races resistant to insects and disease should not obscure the needs for improvement in form and growth rate. This latter point is often taken as a controversial matter in practical management. Do we really need fast-growing races? I believe we do. Taking red pine plantations as an example, we have grown 35 cords per acre in trees 8 inches and over in d.b.h. in 30 years on good sites. This was done by increasing the spacing at which they were planted. The question is how much could we increase that production rate with selected races or hybrids? If an increase of a few cords per acre can be obtained, would not growing red pine for pulpwood in the Northeast be much more attractive and perhaps even rival southern pine?

For timber production with red pine we must prune early and get rapid growth to heal over the pruning wounds. This calls for a maximum growth rate so a race with slender branches and rapid growth would be desirable. We could also use an inherently rapid growth in connection with close spacing from which we might utilize thinnings to maintain a uniform growth rate to produce better quality wood than is presently obtained. The effect of variable growth rate on wood quality is important. In selecting races of red pine in some areas form could be improved, because many red pine plantings produce many crooked stems. We also need insect and disease resistant races of red pine where shoot moth and root diseases are threatening the existence of the species.

In conclusion, we research foresters urgently need information on racial variation in insect and disease resistance and possibilities of increased growth rate through selection and breeding as tools in research along other silvicultural lines. We must gain a greater understanding of the inherent differences in the plant materials with which we work as an aid in evaluating results from research with planted material. Moreover, a longterm program along these lines to develop that ideal tree for a few selected major tree species is a "must" in forestry research.